

DEVELOPMENT AND STANDARDIZATION OF A TEST TO MEASURE KNOWLEDGE LEVEL OF WOMEN ABOUT KITCHEN GARDENING

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ABSTRACT

Knowledge of the respondents plays an important role in adoption of kitchen gardening. A high technical knowledge of kitchen gardening would lead to higher adoption and accumulated in the minds of the women; knowledge both undergoes and produces changes in the thinking process. An attempt has been made to develop a test for measuring the knowledge of farmers on kitchen gardening. After getting the jury opinion of the items, 65 items was drafted and administered to the 60 respondents. After getting jury opinion on the items of test, Item difficulty index, Discrimination index and point bi-serial correlation were worked out. Finally, 45 items were selected in the final format of the knowledge test based difficulty index which is ranges 20 to 80, Discrimination index which ranges to 0.20 to 0.80 and point bi-serial correlation. The reliability coefficient ($r_{tt}=0.72$) obtained indicated that the internal consistency of the knowledge test developed for the study was very high.

Keywords: knowledge, kitchen gardening, reliability, item analysis

INTRODUCTION

The knowledge is operationalised for the present study as “the level of information possessed on kitchen gardening by women. A knowledge test was developed with 65 items to Measure the Knowledge of women on kitchen gardening. Each item is measured on two point continuum. *i.e.* Correct and incorrect with ‘1’ and ‘0’ respectively. The maximum and minimum scores to be obtained are 65 and 0 respectively. The details of the construction and standardization of this knowledge test is given below:

METHODOLOGY

Collection of items

Initially 75 items were collected focusing on various aspects of kitchen gardening. Experts in the field of extension and horticulture were consulted to collect the above 75 items. After screening, fine tuning and editing based on the opinion of the concerned scientists 65 items were remained. The 65 items were subjected to item analysis to screen some more items based on the opinion of the respondents in sample area.

Item analysis

The item analysis was carried out in terms that are difficulty index, discrimination index and point biserial

correlation. The discrimination index provides information on how well an item discriminates in agreement that is whether an item really discriminates well informed respondent from poorly informed respondent. Whereas difficulty index indicates the extent to which an item was difficult. The point biserial correlation provided information on how well item measures or discriminates in agreement with the rest of the test.

Pretesting of the items was done as suggested by Gonard (1948). The items were revised and administered to 60 respondents selected for the purpose of pretesting in controlled situation.

The 65 items were administered to 60 respondents with two point response continuum. The scores allotted were one for correct response and zero for incorrect response. After computing the total score obtained for each of the 60 respondents on 65 items, they were arranged in order from highest to lowest. Based on which the 60 respondents were then divided into six equal groups. These groups were labeled as G1, G2, G3, G4, G5 and G6 with 10 respondents in each group. For the purpose of item analysis, the middle two groups G3 and G4 were eliminated keeping only four extreme groups with high and low scores.

Range of scores obtained by the respondents

Group No.	G1	G2	G3	G4	G5	G6
Score Range	55-63	49-54	43-48	39-42	28-38	7-27
No. of Respondent	10	10	10	10	10	10

Item Difficulty Index (P)

The item difficulty index was defined as the proportion of the farmers giving correct answer to that particular item. The index indicates the extent to which an item is difficult. Here in the present study, the higher index means a high proportion of women gave correct answers to the items on kitchen gardening . The difficulty level was calculated using the following formula-

$$P_i = \frac{n_i}{N_i} \times 100$$

Where,

P_i = Difficulty index in percentage of the i^{th} item.

n_i = Number of respondents giving correct answer to i^{th} item.

N_i = Total number of respondents to whom the i^{th} item was administered *i.e.* 60

For example, substituting the value for item no. 1 of kitchen gardening of the table....., the values arrived at is:

$$\begin{aligned} P_i \text{ (difficulty index)} &= \frac{n_i}{N_i} \times 100 \\ &= \frac{45}{60} \times 100 \\ &= 45.00 \end{aligned}$$

The difficulty index was worked out as the percentage of the respondents answering an item correctly. The items with 'p' values ranging from 20 to 80 were considered for the final selection of the knowledge test.

Item Discrimination Index ($E^{1/3}$)

The Second criterion for item selection was the discrimination index indicated by $E^{1/3}$ value for an item. The function of items discrimination index is to find out whether an item really discriminates a well-informed respondent from poorly informed respondents. The discrimination index indicated by " $E^{1/3}$ " which is calculated by the formula:

$$E^{1/3} = \frac{(S_1 + S_2) - (S_5 + S_6)}{N/3}$$

Where,

$E^{1/3}$ = Discrimination index of an item.

S_1, S_2 and S_5, S_6 = frequencies of correct answers in the groups G1, G2 and G5 and G6 respectively.

N = total member of respondents of the sample selected for the item analysis that is 60.

For example, substituting the values for item no. 1 of the table....., the values arrived at is:

$$\begin{aligned} E_{1/3} \text{ (discrimination index)} &= \frac{(S_1+S_2) - (S_5+S_6)}{N/3} \\ &= \frac{(8+6) - (2 + 1)}{60/3} \\ &= 0.55 \end{aligned}$$

The discrimination index varies from 0 to 1. The items with discrimination index ranging from 0.20 to 0.80 were selected for the final test.

Reliability of the Test

Split half reliability method was used to find out the reliability of the test. In this method, all the 49 items were first randomly arranged and then divided into two equal halves one containing the odd items and other one containing the even items. The test was administered to twenty respondents and the two sets of knowledge scores obtained by the women were correlated. Thus, two sets of scores were obtained and then scores were correlated with each other by product moment correlation. The product moment correlation coefficient for two sets of scores was 0.63. Using spearman-Brown formula, reliability coefficient was calculated as:

Spearman – Brown prophecy formula:

$$r_{tt} = \frac{2r_{tt}}{1 + r_{tt}}$$

Where :

r_{tt} = The reliability of the original test.

$\frac{1}{2} r_{tt}$ = The reliability coefficient obtaining by correlating the scores of the odd and even items

The value of r_{tt} came to be 0.57, testifying the internal consistency of the knowledge test.

The co-efficient correlation ($r=0.72$) was highly significant indicating a high degree of dependability of the test for measuring knowledge of women towards kitchen gardening.

Validity of the Test

The two methods employed to know the validity of the test were jury opinion and point biserial correlation. Content validity was ensured initially by administering every item to different experts for evaluating the representation of universe by the test, its relevance and appropriateness.

Biserial Correlation (r pbis)

The main aim of calculating point biserial correlation was to work out the internal consistency of the items i.e. the relationship of the total score to a dichotomized answer to any given item. In a way, the validity power of the item was computed by the correlation of the individual item of preliminary knowledge test calculated by using the formula suggested by Garret (1966). Point biserial correlation for each item to preliminary knowledge test was calculated by:

$$\text{Point Biserial correlation (rpbis)} = \frac{Mp-Mq}{\sigma_t} \times 100$$

Where,

Mp = Mean of x values for higher group in dichotomized variable

Mq = Mean of x values for lower group in dichotomized variable

p = Proportion of cases in higher group

q = Proportion of cases in lower group

The calculated point bi-serial (rpbi) correlation of every item determined the construct validity of the test. The items with significant correlation coefficients either at 1 or 5 per cent level were included in the standard knowledge test designed to measure the knowledge of women towards kitchen gardening in Table 1.

Total items selected

Out of 65 items, 45 items were finally selected based on

- ♦ Items with difficulty level indices ranging from 20 to 80.
- ♦ Items with discrimination indices ranging from 0.2 to 0.8.
- ♦ Items having significant point biserial correlation either at 1 per cent or 5 per cent level.

Items have 0.80 and 0.20 as correct proportion. The average of these proportions is equal to $(0.80 + 0.20)/2 = 0.50$.

Thus, the finally selected knowledge test items comprised of 2 types of questions viz. multiple choice and true / false, totaling to 45 items to measure the knowledge on kitchen gardening. The selected items with P, E^{1/3} and Rpbis values are appended (Table 1).

RESULTS AND DISCUSSION

The results of the knowledge test obtained were as follows in Table 1. Out of 65 items, 45 items were finally selected. The items in the knowledge test were administered to the respondents in the local language and their responses were recorded in the form of correct or incorrect answers. A weightage of 1 was assigned to correct answer and for incorrect answer, a weightage of "0" was assigned.

Table 1 : Final format of the knowledge test with their difficulty index, discrimination index and point bi-serial correlation for women towards kitchen gardening

Sr. No.	Items	Difficulty index	Discrim-ination index	Point bi-serial correlation
1	Which type of soil is most suitable for kitchen garden?	45.00	0.55	0.557
2	How to prepare soil for kitchen garden?	38.33	0.30	0.419
3	What is sowing time of monsoon vegetables for kitchen garden?	76.67	0.35	0.516
4	What is sowing time for winter vegetables for kitchen garden?	76.67	0.60	0.580
5	What is sowing time for summer vegetables for kitchen garden?	13.33	0.10	0.448
6	Which of the following vegetables can be grown in winter season?	76.67	0.35	0.364

Sr. No.	Items	Difficulty index	Discrim-ination index	Point bi-serial correlation
7	Which of the following vegetables can be grown in summer season?	60.00	0.40	0.388
8	Which of the following vegetables can be grown as perennials?	60.00	0.40	0.663
9	Which of the following insect/s appear/s in tomato?	73.33	0.40	0.534
10	Which of the following insect/s appear/s in chilli?	63.33	0.30	0.371
11	Which of the following insect/s appear/s in the vines vegetable?	85.00	0.45	0.505
12	M-56 and M-65 are the varieties of which vegetable?	66.67	0.35	0.620
13	Pusa-Navbahar and Pusa-Sadabahar are varieties of which vegetable?	60.00	0.45	0.337
14	Pusa-Ketki, Pusa-Dipali and Pusa early are varieties of which vegetable?	73.33	0.30	0.331
15	Which of the following vegetable crops can be grown all the seasons, viz. winter, monsoon, summer season?	73.33	0.25	0.564
16	Which of the following vegetable crop can be grown through seeds?	73.33	0.35	0.634
17	Which of the following vegetable crop can be grown through part of plant?	75.00	0.30	0.500
18	Cucumber, Chilli, Bottle-gourd & Tomato are sources of which vitamin?	71.67	0.30	0.403
19	Which of the following is/are source vitamin C?	76.67	0.15	0.365
20	Which of the following is/are source of phosphorous?	63.33	0.40	0.378
21	A pit made in corner of kitchen garden is called as	51.67	0.00	0.354
22	S-4GG9 is variety of which of the following?	71.67	0.20	0.443
23	Dolly-5 is variety of which of the following?	71.67	0.15	0.417
24	Which of the following fruit crops can be grown in kitchen garden?	75.00	0.50	0.507
25	What is vermicompost?	78.33	0.20	0.387
26	What is/are the benefit/s of carrot juice?	75.00	0.20	0.456
27	What is/are the benefit/s of bottle gourd juice?	35.00	0.60	0.360
28	What is/are the benefit/s of onion juice?	50.00	0.05	0.436
29	What is/are the benefit/s of juices of Spinach, Amaranths, Fenugreek and Radish?	60.00	0.40	0.719
30	Eating which of the following vegetable/s, consumption of milk should be avoided	71.67	0.30	0.370
31	Which of the following crop/s are grown through seeds?	51.67	0.20	0.591
32	Which of the following crop/s is/are grown through tuber?	33.33	0.25	0.532
33	Which of the following crop/s is/are grown through stem?	43.33	0.50	0.500
34	Which of the following crop/s is/are grown through seedlings?	60.00	0.35	0.646
35	Which of the following crops are grown by maintaining proper spacing between two rows and plants?	70.00	0.65	0.538
36	Which among the following are vines?	76.67	0.05	0.403
37	Disease infected material should be buried in the pit.	60.00	0.50	0.498
38	Use of pheromone trap to control pest is risky for human health.	60.00	0.20	0.367
39	Ladybird beetle observed in kitchen garden should be killed.	73.33	0.50	0.364

Sr. No.	Items	Difficulty index	Discrim-ination index	Point bi-serial correlation
40	Trichoderma is useful parasite for kitchen garden.	60.00	0.20	0.498
41	Neem-based pesticides are risky for human health.	60.00	0.20	0.395
42	Use of Light-trap is advisable for insect control in kitchen garden	73.33	0.60	0.362
43	Selection of place where availability of sunlight is less during day time is more advisable to grow vegetables.	76.67	0.05	0.340
44	Vegetables without weed control can be grown well in kitchen garden.	60.00	0.40	0.547
45	Chemical pest control method is more advisable than biological control method in kitchen garden.	60.00	0.50	0.503

REFERENCES

Interdiscipline, 7(1):65-67.

Bloom, S.S., Engelhard, M., Furst, E., Hill W. and Krathwal, D.R. 1955. Taxonomy of Educational Objectives: The cognitive Domain. Orient Longmans, New York.

English, H. B. and English, A.G.(1961). New York: A comparative dictionary psychological and psychoanalytical items.

Guilford, J. P. (1965). Fundamental statistics in psychology and Education, New York, MxGraw Hell-Book Co. Inc: 317-319.

Jha, P. N. and Singh, K. N. (1970). A test to measure farmers' knowledge about high yielding variety programme.

Khatri, K. D. and Patel, Arun (2018) Development of the test to measure the knowledge about research recommendations of Anand Agricultural University. *Guj. J. Ext. Edu.* 29(2):137-142.

Srinivas. A, V. Sudha Rani and P. Archana (2014) Construction of Knowledge Test to Measure the Knowledge of Agriculture Officers on IPM, INM and IWM Practices: *Global journal for research analysis*, 3(1):2277-8160

Thorat, G. N., Vahora, S. G., and Ramjiyani, D. B.(2015) : A Test to Measure Knowledge About Poultry Management Practices; *Guj. J. Ext. Edu.* Vol. 26(1): 4-6

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